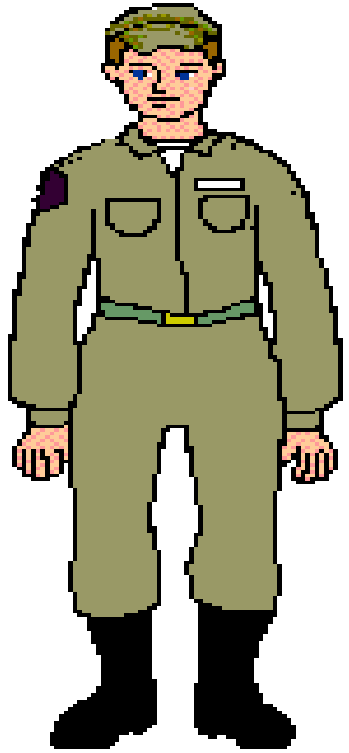
Armed Forces College of Medicine

AFCM



The Gluteal Region I

By

Prof Azza Kamal

Intended Learning Outcomes

By the end of this lecture, each student should be able to:

1) **Define the gluteal region.**
2) **Enumerate the cutaneous nerve supply of the four quadrants of this region.**
3) **Describe the attachments, nerve supply and action of the three glutei & tensor fasciae latae .**
4) **Describe the important role of glutei medius & minimus during walking .**
5) **Comment on the effect of unilateral or bilateral paralysis of glutei medius and minimus.**
6) **Demonstrate the safe site for giving IM injection in the gluteal region.**

KEY POINTS OF LECTURE

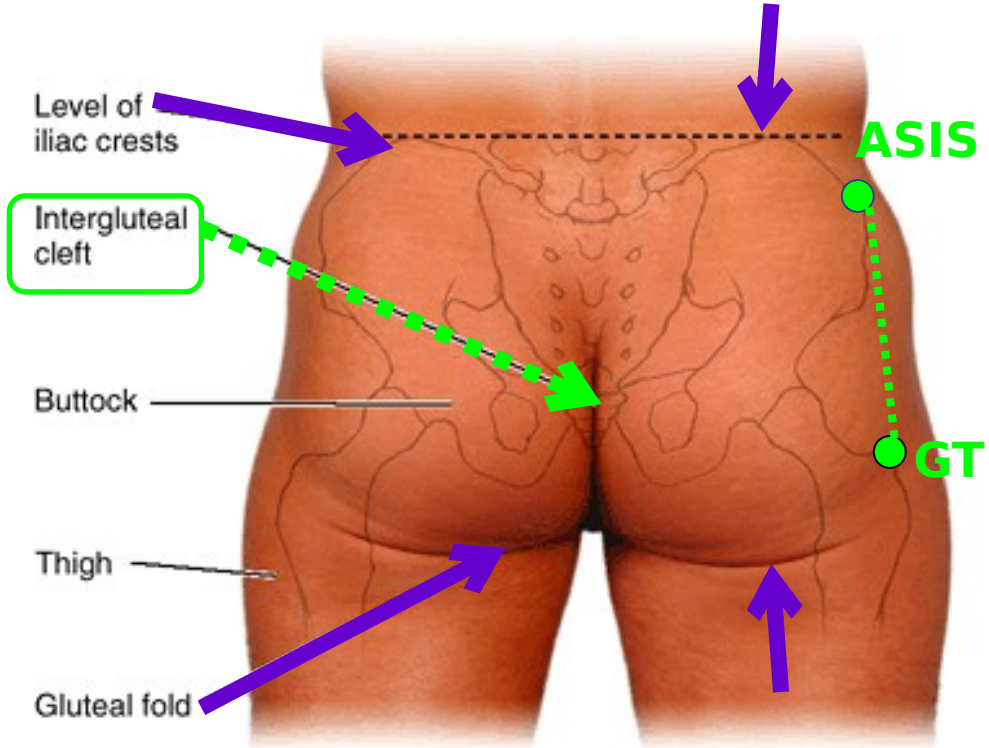
1)Attachment, nerve supply & action of:
a)Gluteus maximus
b)Gluteus medius
c)Gluteus minimus
d)Tensor fascialatae

2) Role of Gluteus medius & minimus during walking
3) Effect of unilateral & bilateral paralysis of Gluteus medius & minimus
4) Safe site for giving IM injection

Gluteal Region:

- It extends from the iliac crest above to the gluteal fold below

& from the natal cleft (intergluteal cleft) medially to a line extending from ASIS to Greater



https://lh3.googleusercontent.com/wRVKQZM0sgUh3FKHO71Ygo

NB: **gluteal fold is a skin fold at the junction between gluteal region & back of thigh.**

Cutaneous nerves of the gluteal region

Upper & Anterior:

Subcostal (T12)

Iliohypogastric (L1)

Upper & Posterior:

Post rami of L1,2,3

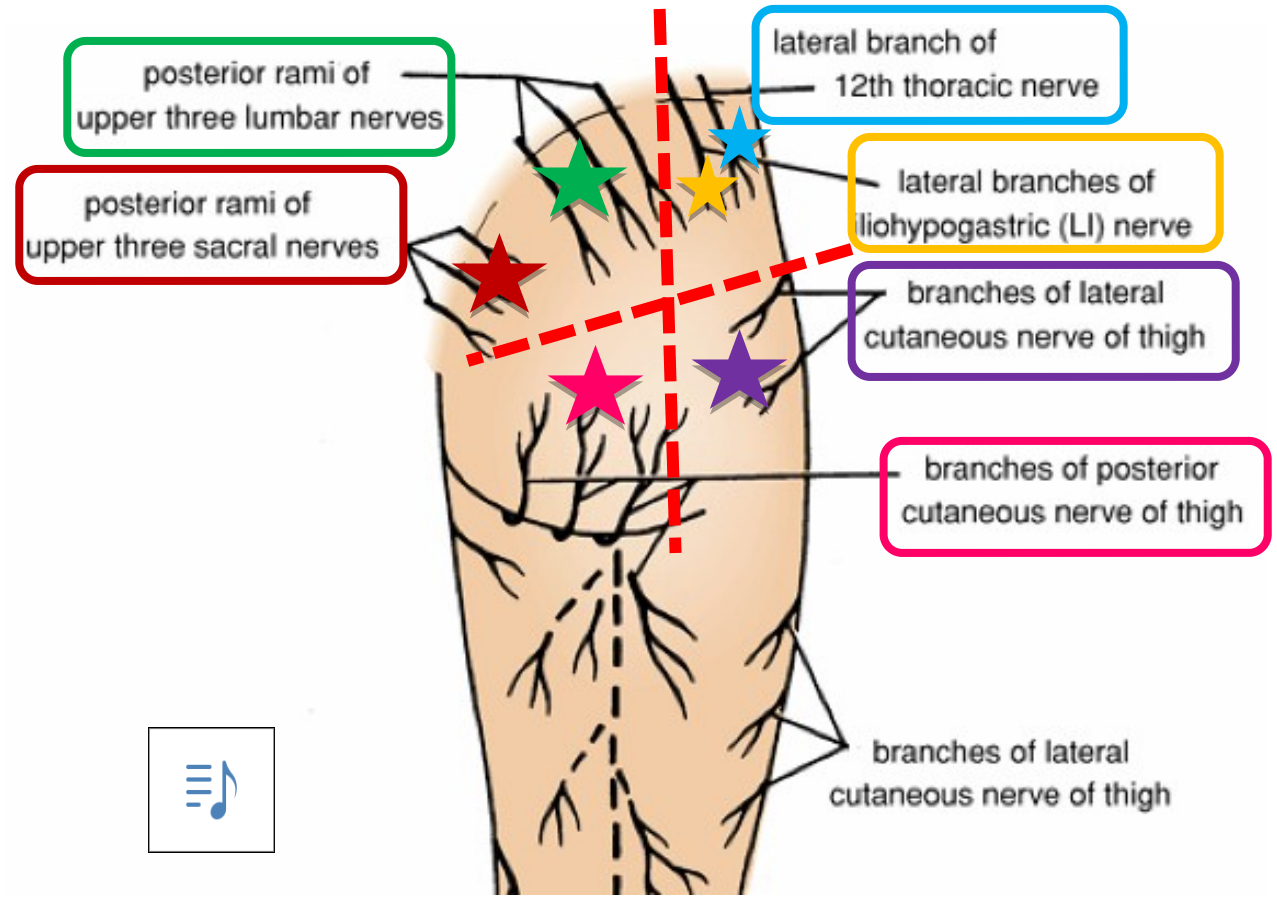
Post rami of S1,2,3

Lower & Anterior:

Lat.cut.n.of thigh L2,3

Lower & Posterior:

Post.cut.n.of thigh S1,2,3



https://lh3.googleusercontent.com/7Z3SRGbhYxF3ZqSrwzsJ0m

Muscles of the gluteal region

Large muscles

Glutei 3“

Small muscles

lateral 6“

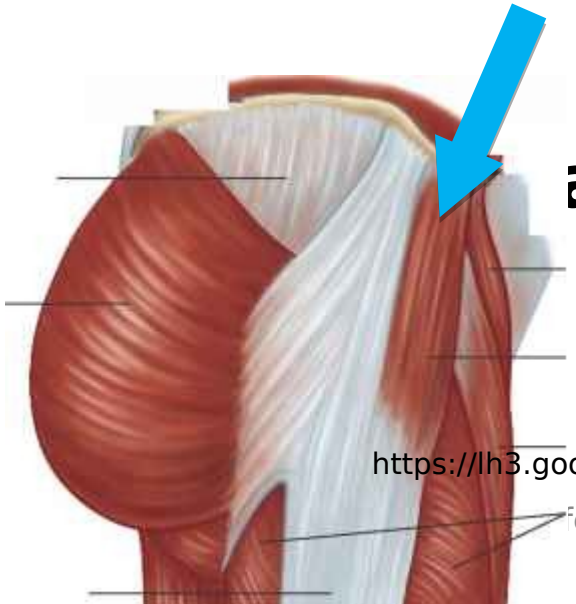
All these muscles are supplied by nerves derived from sacral plexus
except one muscle which is supplied by a nerve from lumbar plexus

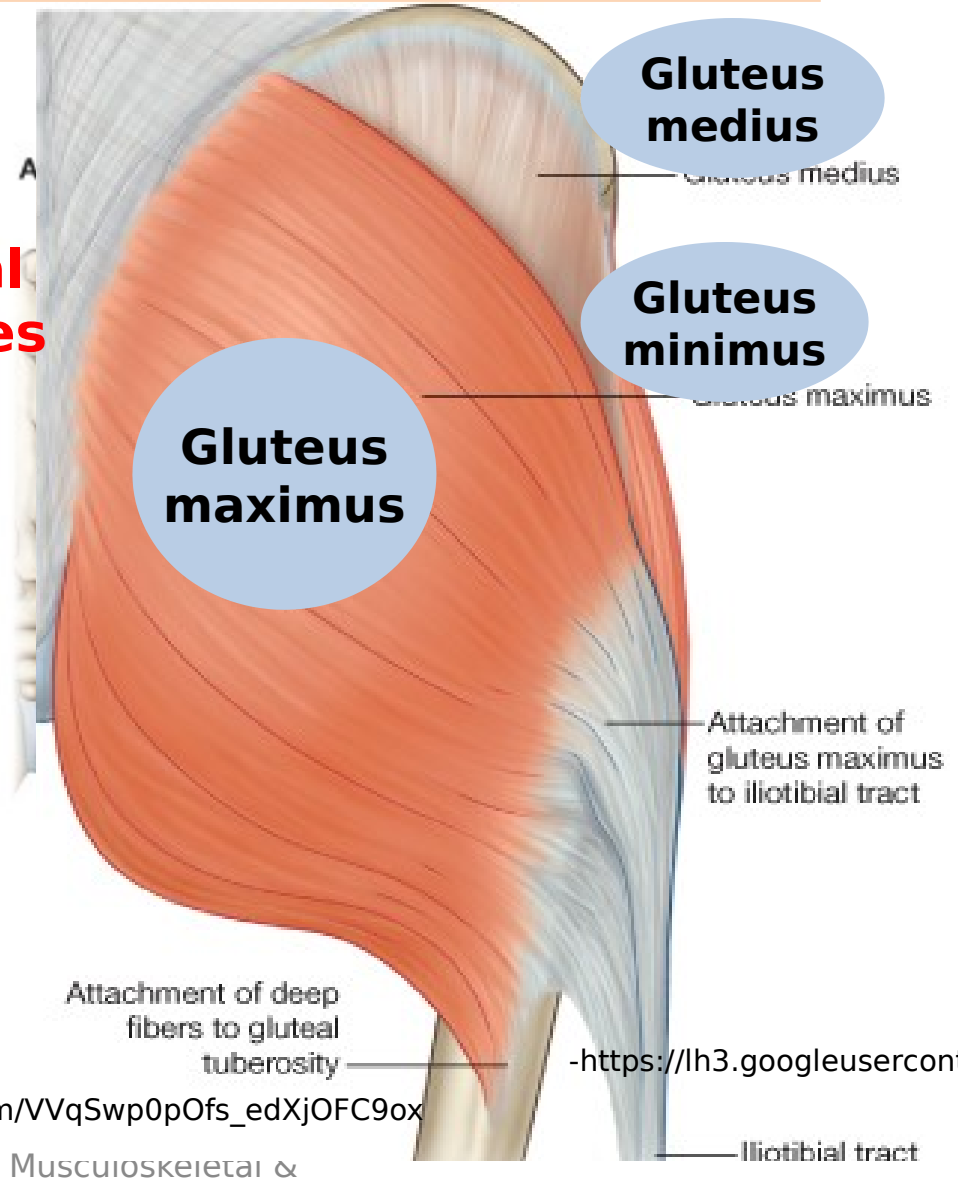
Large muscles of the gluteal region

1. Gluteus maximus
2. Gluteus medius
3. Gluteus minimus

3 Gluteal muscles

4 ae



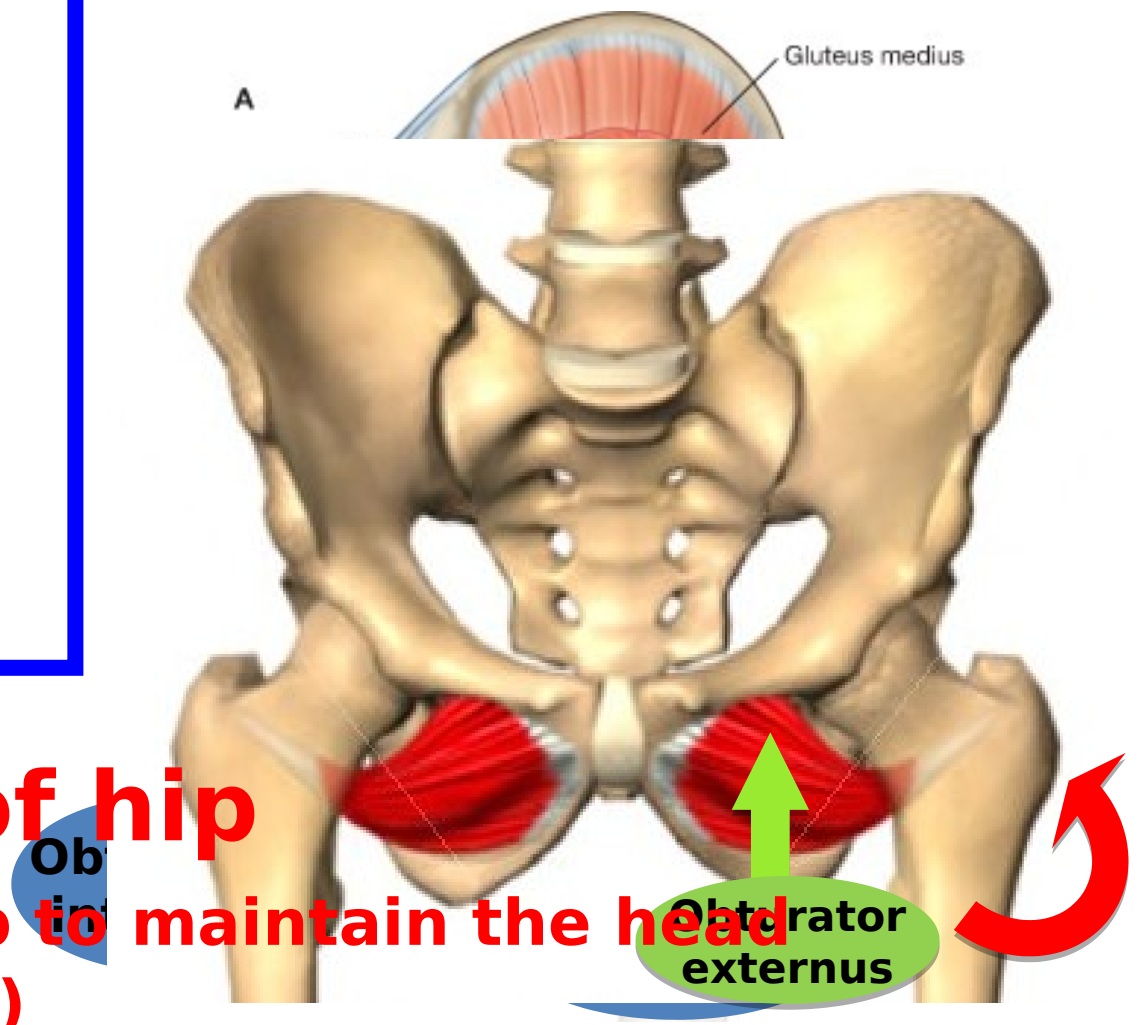


https://lh3.googleusercontent.com/VVqSwp0pOfs_edXjOFC9ox

-https://lh3.googleusercontent.com/sflI_o_Eor

Small muscles of the gluteal region

1. Piriformis
2. Obturator internus
3. Superior Gemellus
4. Inferior Gemellus
5. Quadratus femoris
6. Obturator externus



6 lateral rotators of hip

ey stabilize the hip joint (help to maintain the head of femur in the acetabulum)

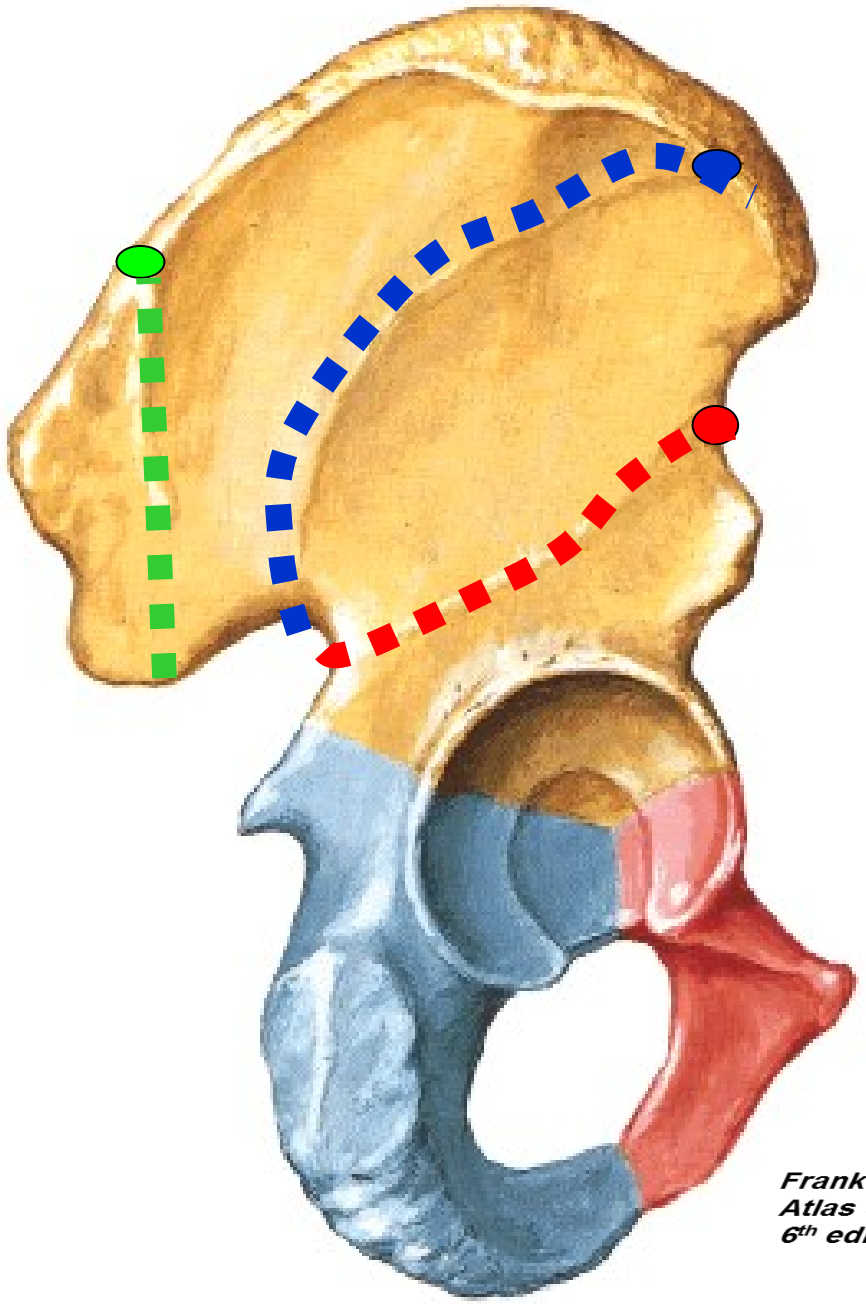
https://lh3.googleusercontent.com/1MpaVALIkzbSXjCZ2ZKIdjL

- **Gluteal surface of ilium:**
- **Divided into 4 areas by 3 gluteal lines**

1.Posterior gluteal line

2.Anterior gluteal line

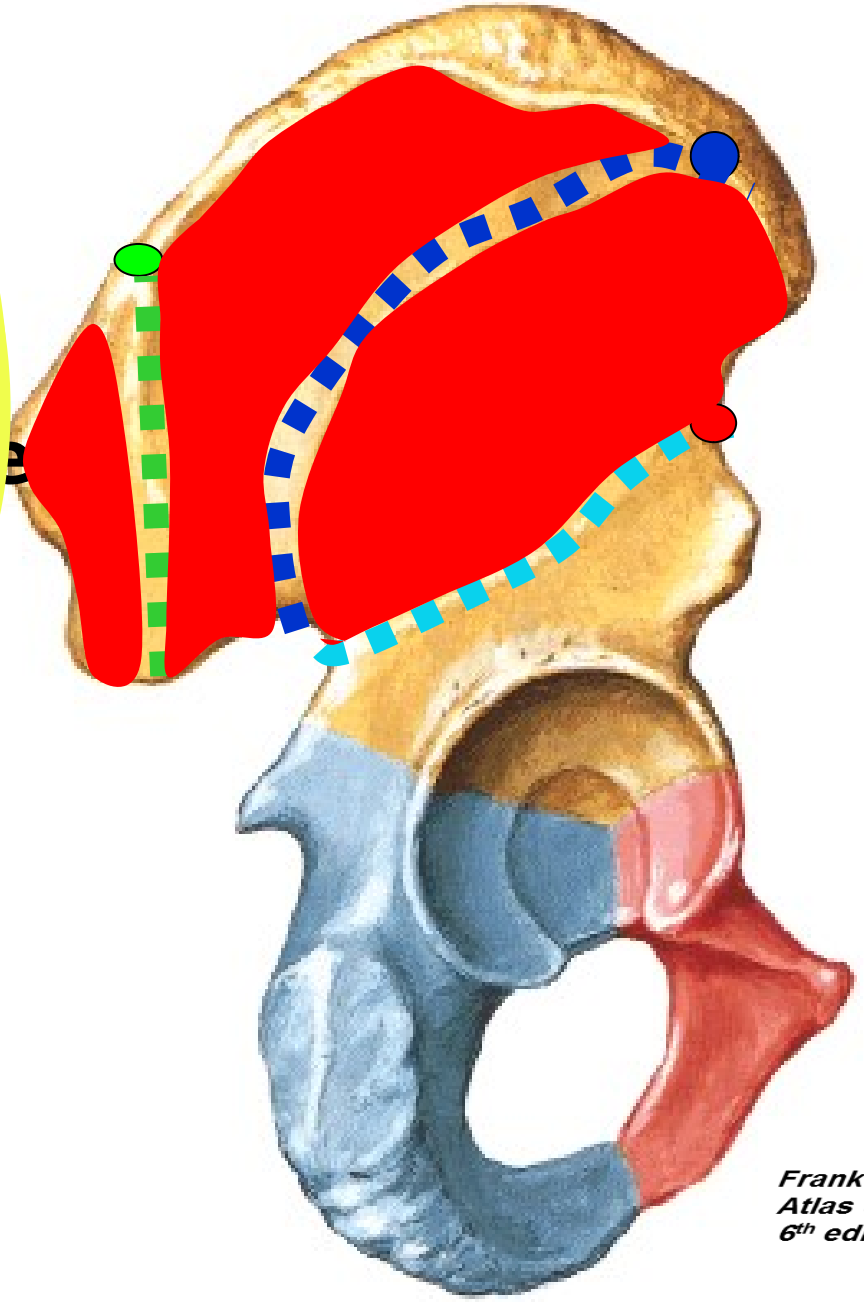
3.Inferior gluteal line



Frank H. Netter
Atlas of Human Anatomy
6th edition

Origin of gluteus minimus

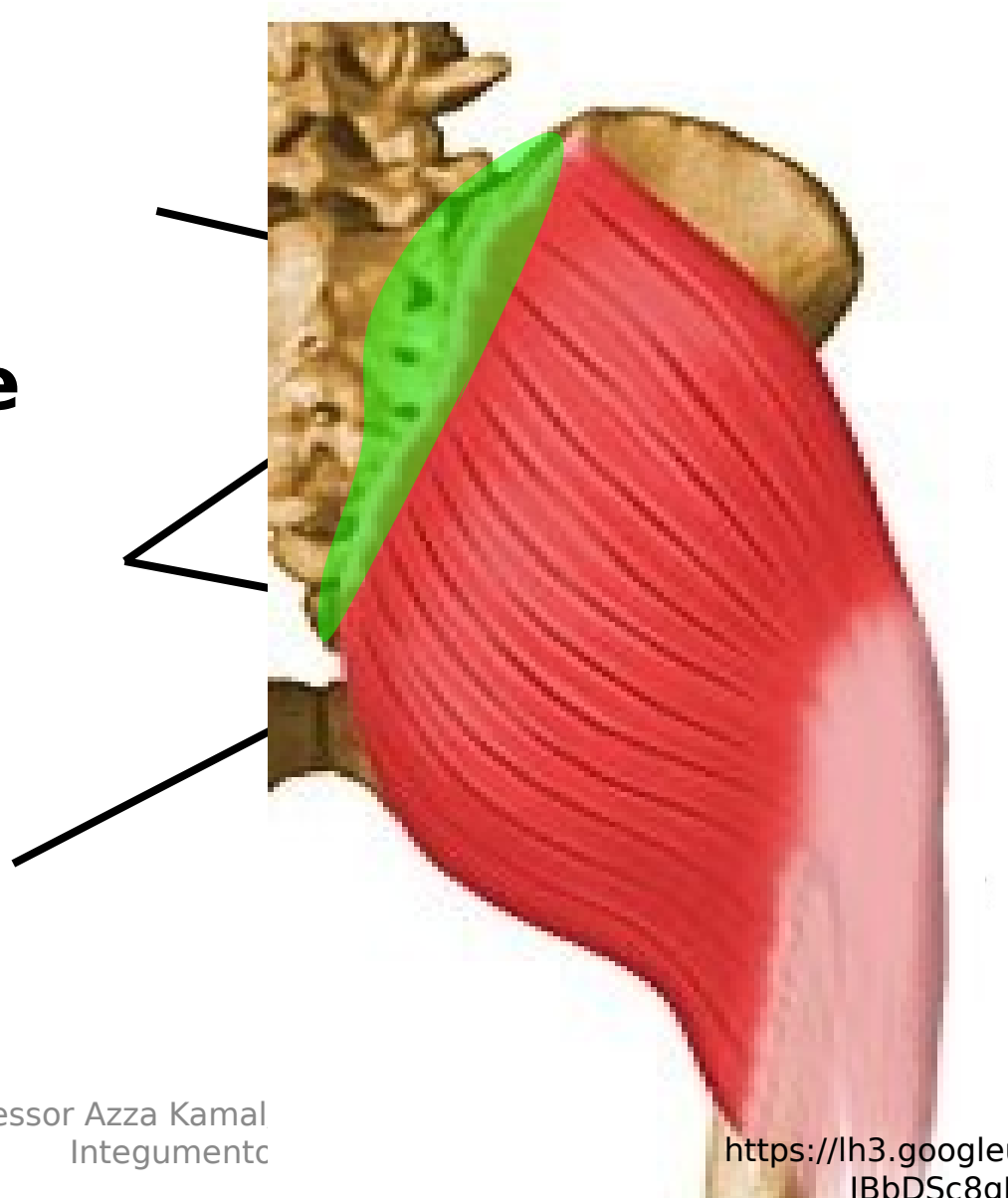
- between anterior & inferior gluteal lines



Frank H. Netter
Atlas of Human Anatomy
6th edition

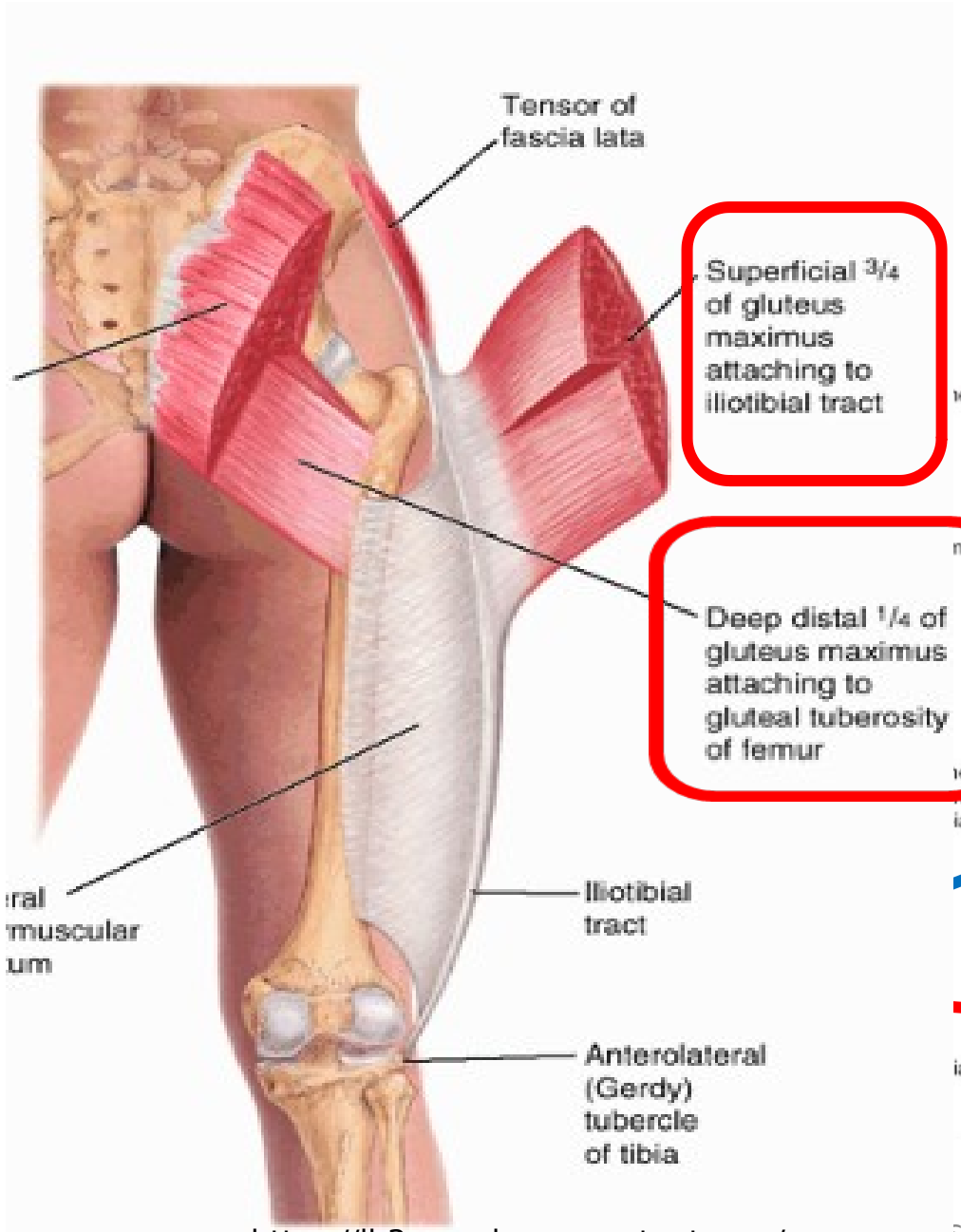
Gluteus maximus

- **Origin**
- **Gluteal surface of ilium behind posterior gluteal line**
- **Back of sacrum & coccyx**
- **Back of sacrotuberous ligament**



https://lh3.googleusercontent.com/IBbDSc8gEBI2MpIm4f0vgIB

Insertion of gluteus maximus



https://lh3.googleusercontent.com/JFcoozZ23C9s19mq9sMhEf

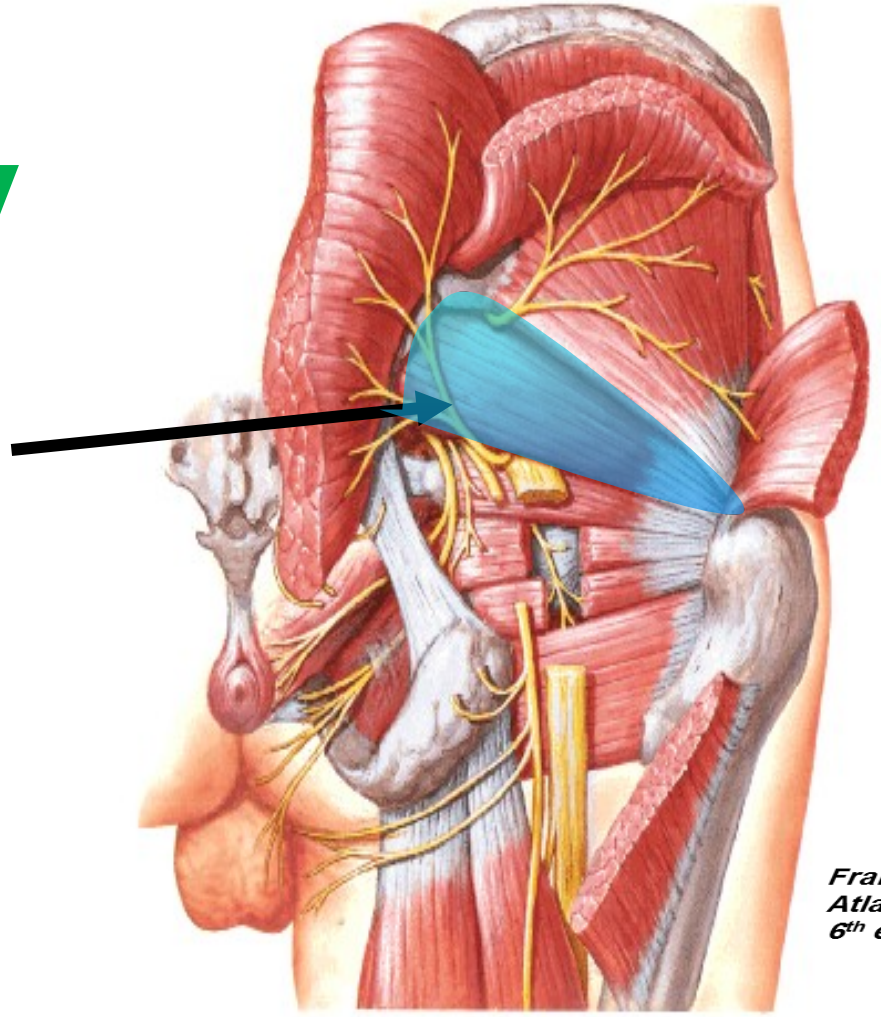
Superficial ¾ into iliotibial tract

Deep ¼ into gluteal tuberosity

Gluteus maximus

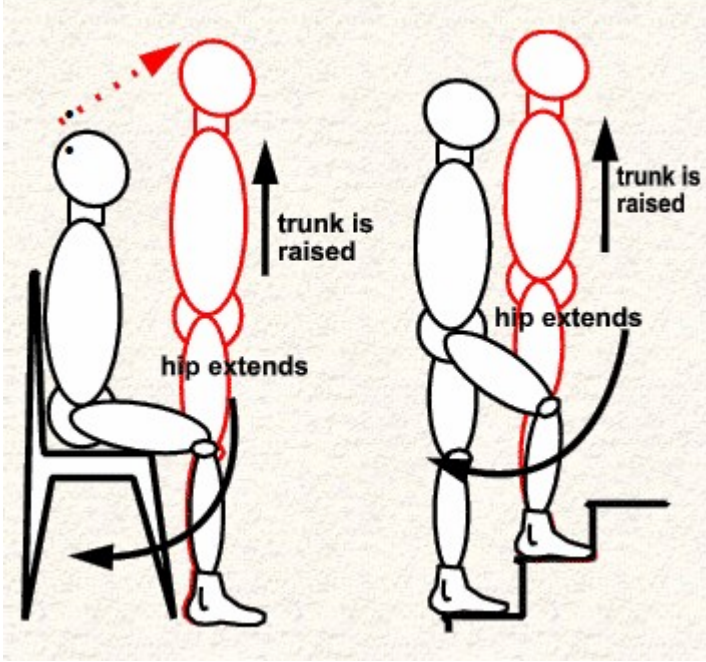
Nerve supply

Inferior gluteal nerve



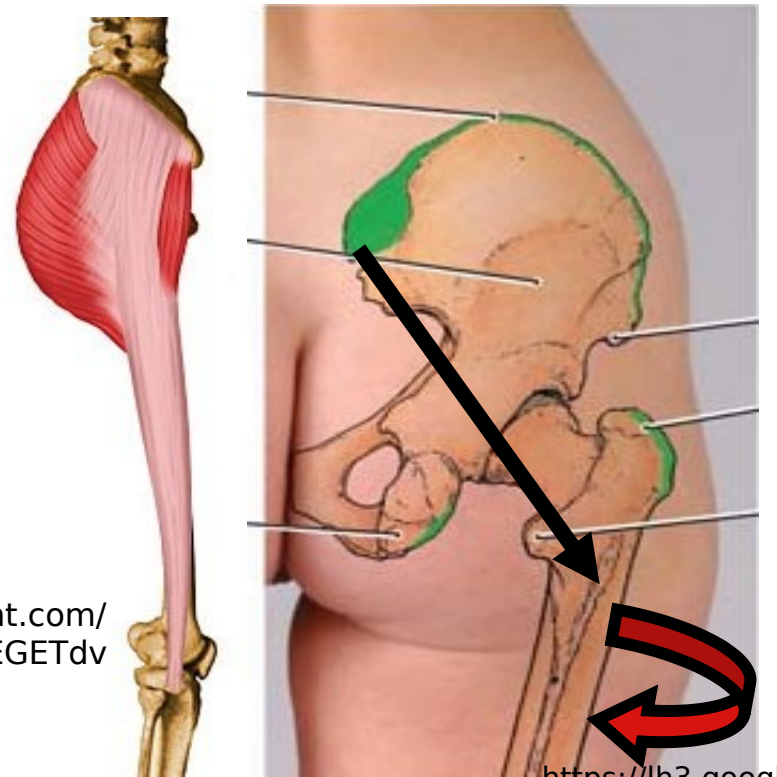
Frank H. Netter
Atlas of Human Anatomy
6th edition

Action of gluteus maximus



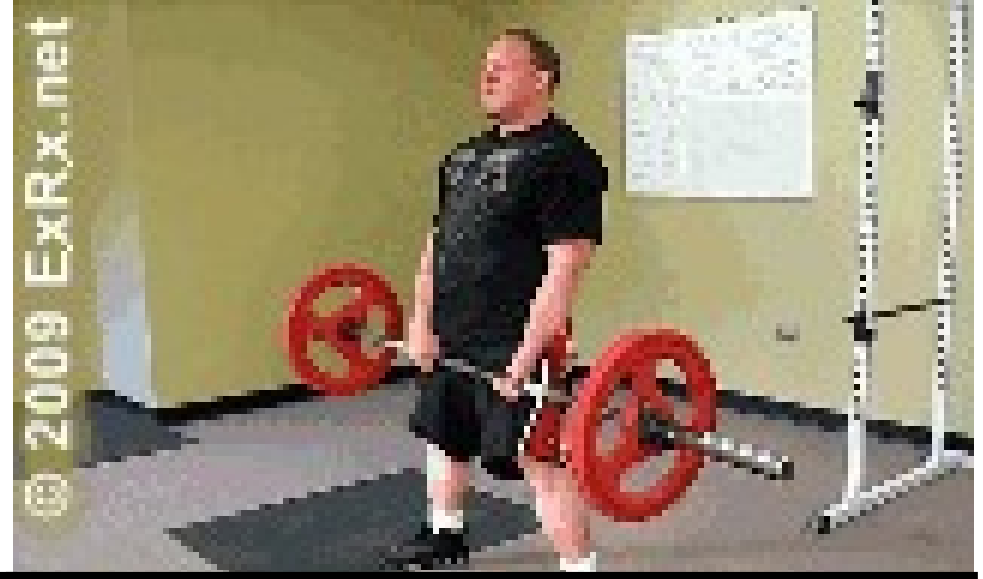
- **The main & strongest extensor of the hip joint (essential in standing up from the sitting position, climbing up stairs and running)**

- **Assists in lateral rotation of the thigh**
- **Through its attachment to iliotibial tract, it stabilizes hip bone on femur & femur on tibia during standing to maintain the erect posture**



https://lh3.googleusercontent.com/-gH1Sbi9EGETdv

Extension of the hip against resistance
(e.g. rising from sitting position)



Extension of the hip against resistance
(e.g lifting heavy weights from ground)

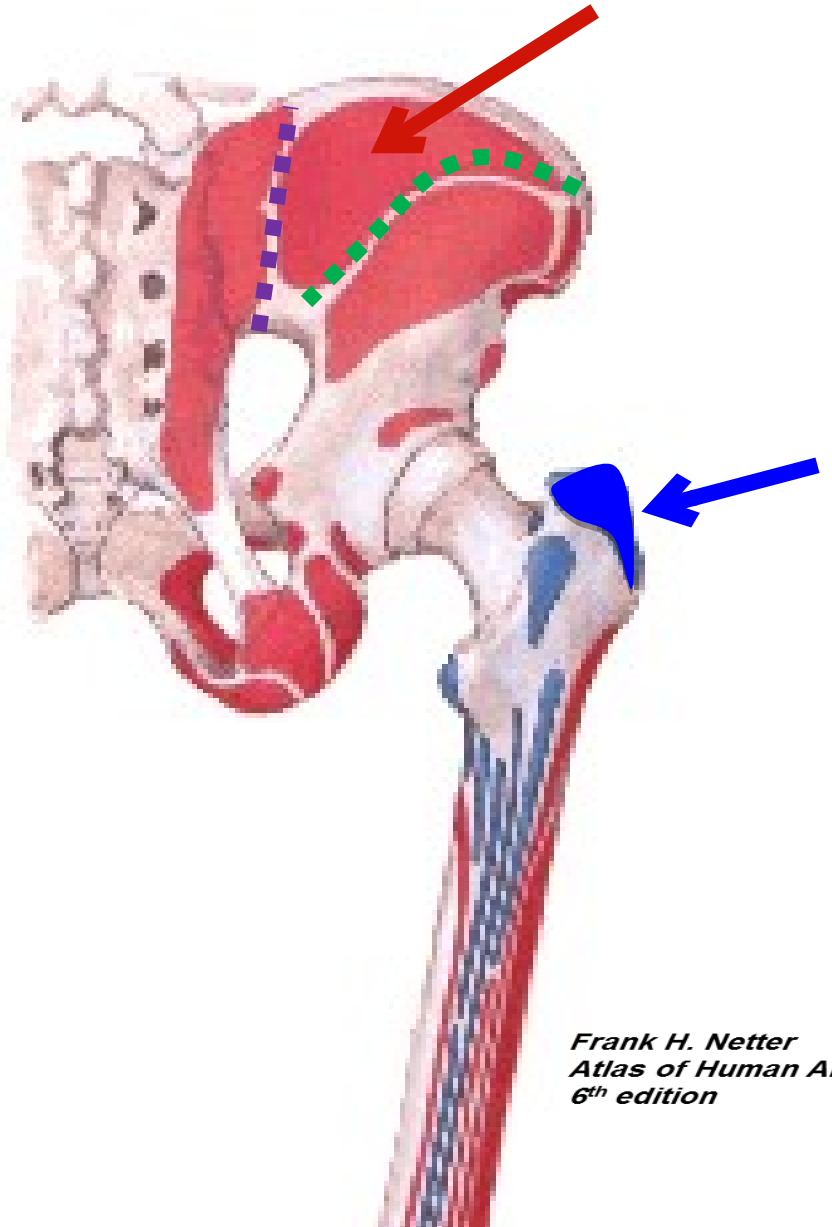
Extension of the hip against resistance

continuously active in strong lateral rotation of the thigh

Gluteus medius

- **Origin** ▯ **gluteal surface of ilium, between anterior & posterior gluteal lines**

- **Insertion** ▯ **lateral surface of greater trochanter**

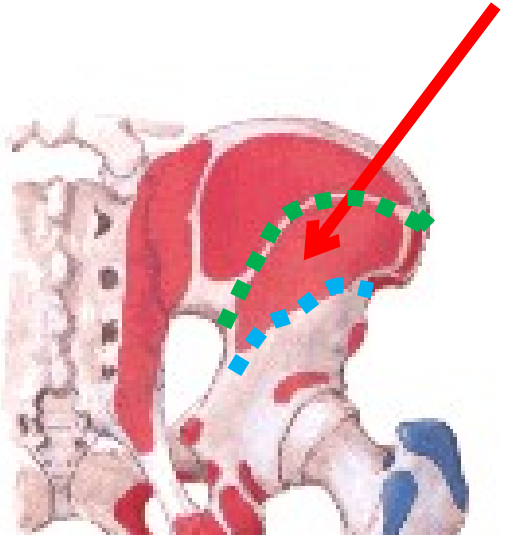


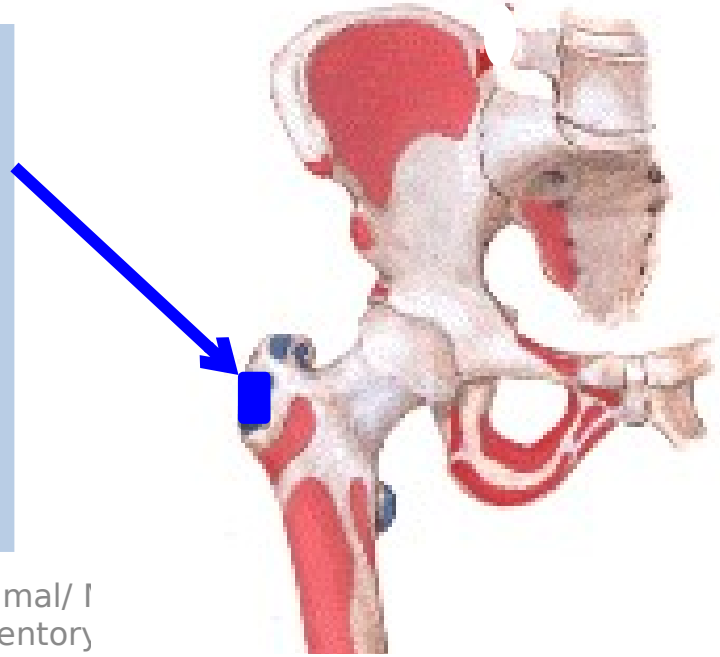
Frank H. Netter
Atlas of Human Anatomy
6th edition

Gluteus minimis

- **Origin**
  gluteal surface of ilium, between anterior & inferior gluteal lines

- **Insertion**
  front of greater

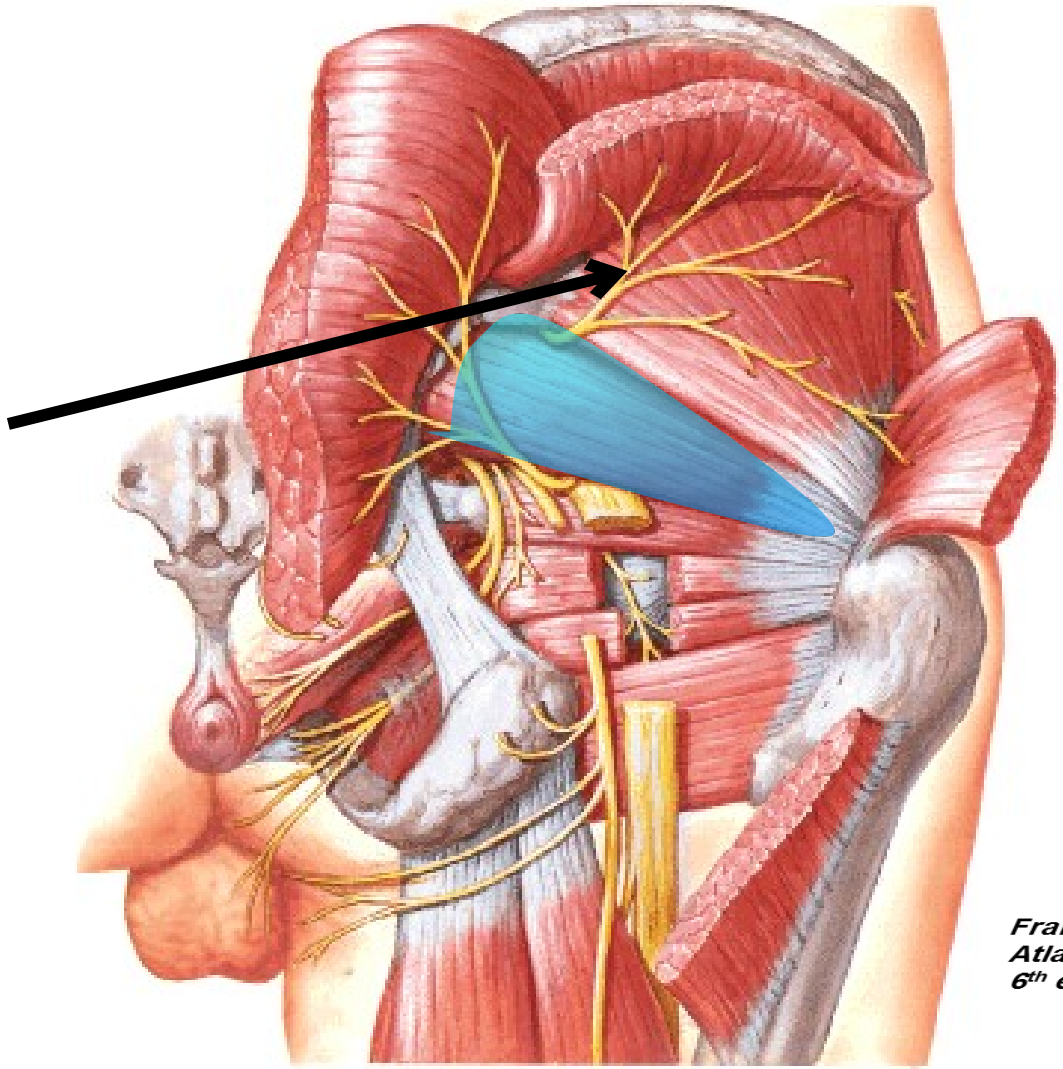




Frank H. Netter
Atlas of Human Anatomy
6th edition

Gluteus medius & minimus

- **Nerve supply: superior gluteal nerve**



Frank H. Netter
Atlas of Human Anatomy
6th edition

Minimus

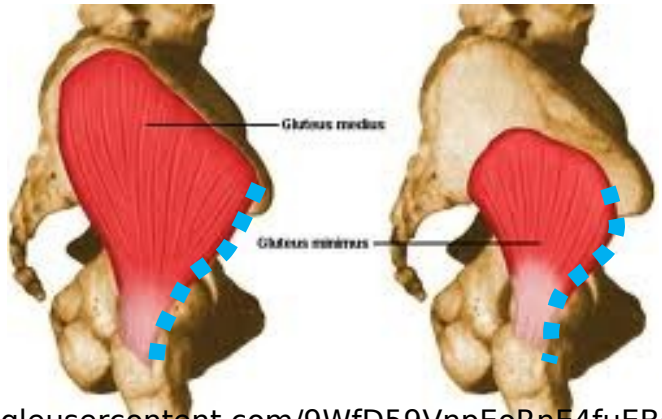
Medius

Maximus

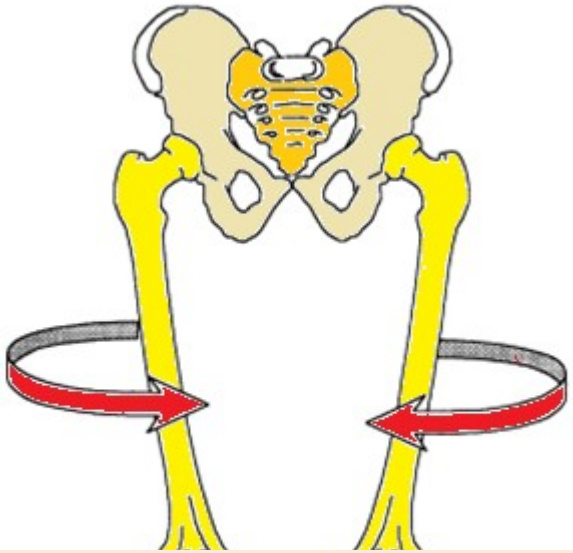
Frank H. Netter
Atlas of Human Anatomy
6th edition

letal &

Action of gluteus medius and minimus

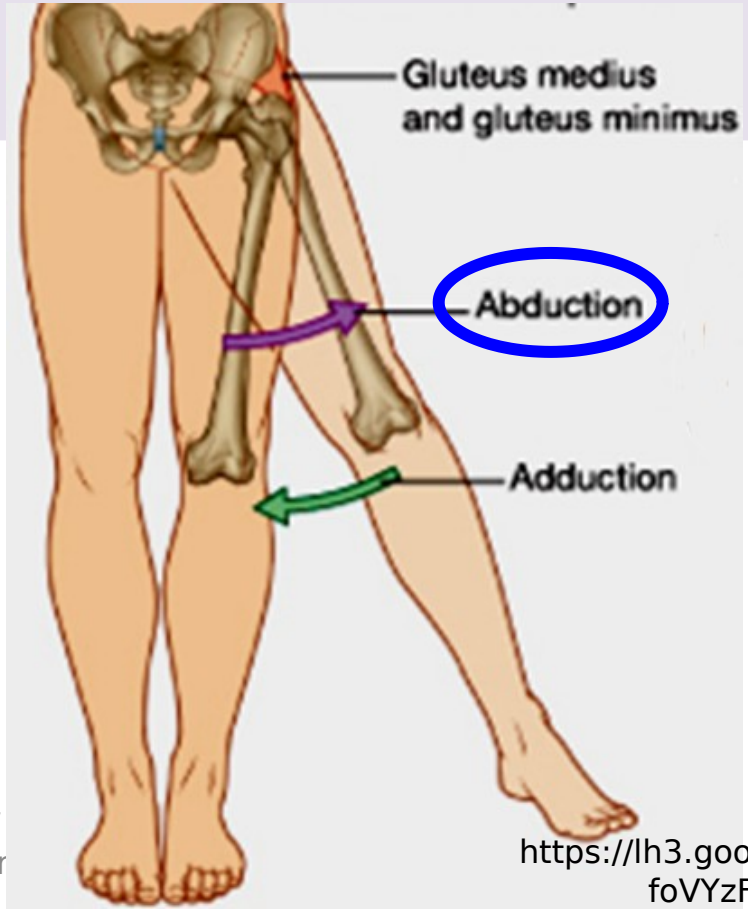


https://lh3.googleusercontent.com/9WfD59VnpEoRnE4fuEBq



Their anterior fibers are medial rotators

Main abductors of



https://lh3.googleusercontent.com/foVYzFe9Be88tZWi7keWEA

https://lh3.googleusercontent.com/97cE2rutlMve6ZNdKfhEFU

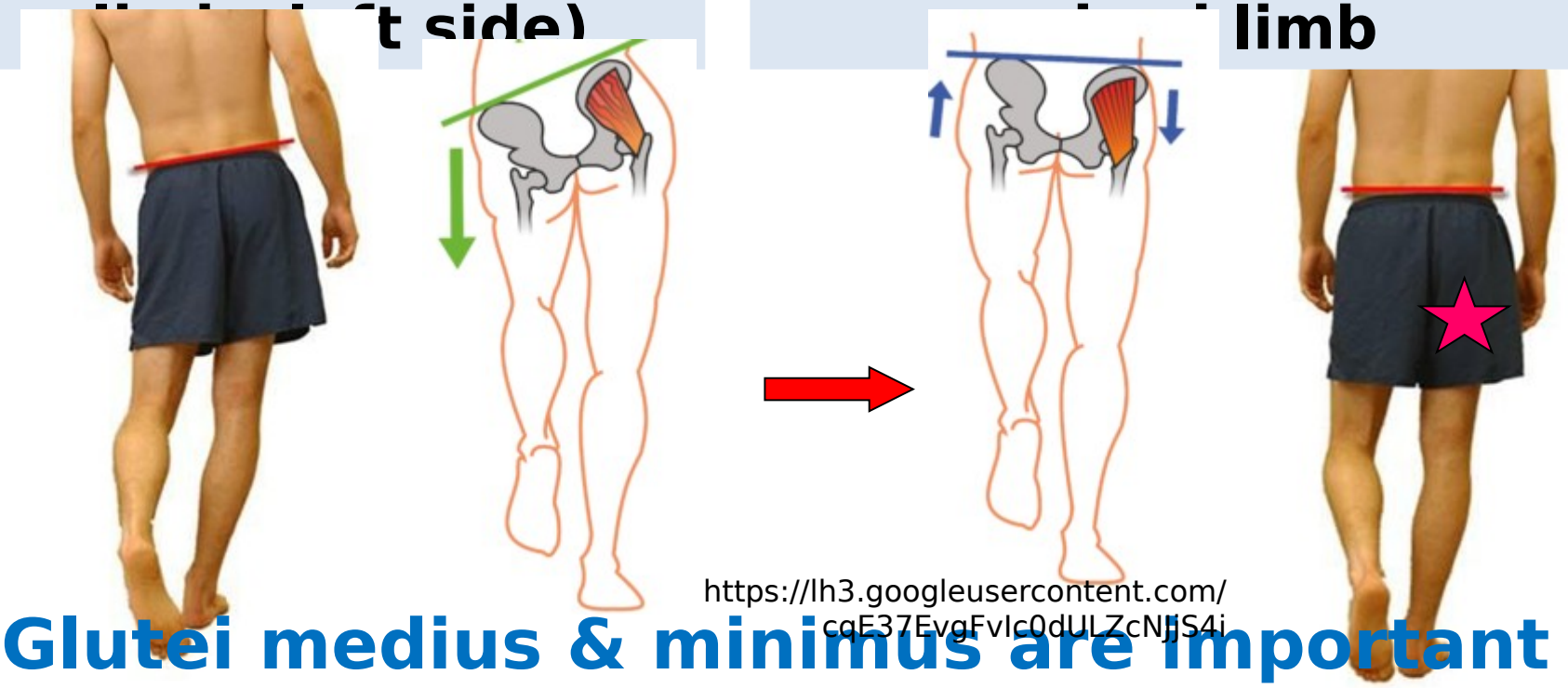
Action of glutei medius & minimus

- Powerful abductors of thigh

Action of glutei medius & minimus

In walking, gravity tends to tilt the pelvis and trunk to the unsupported side (raised left side)

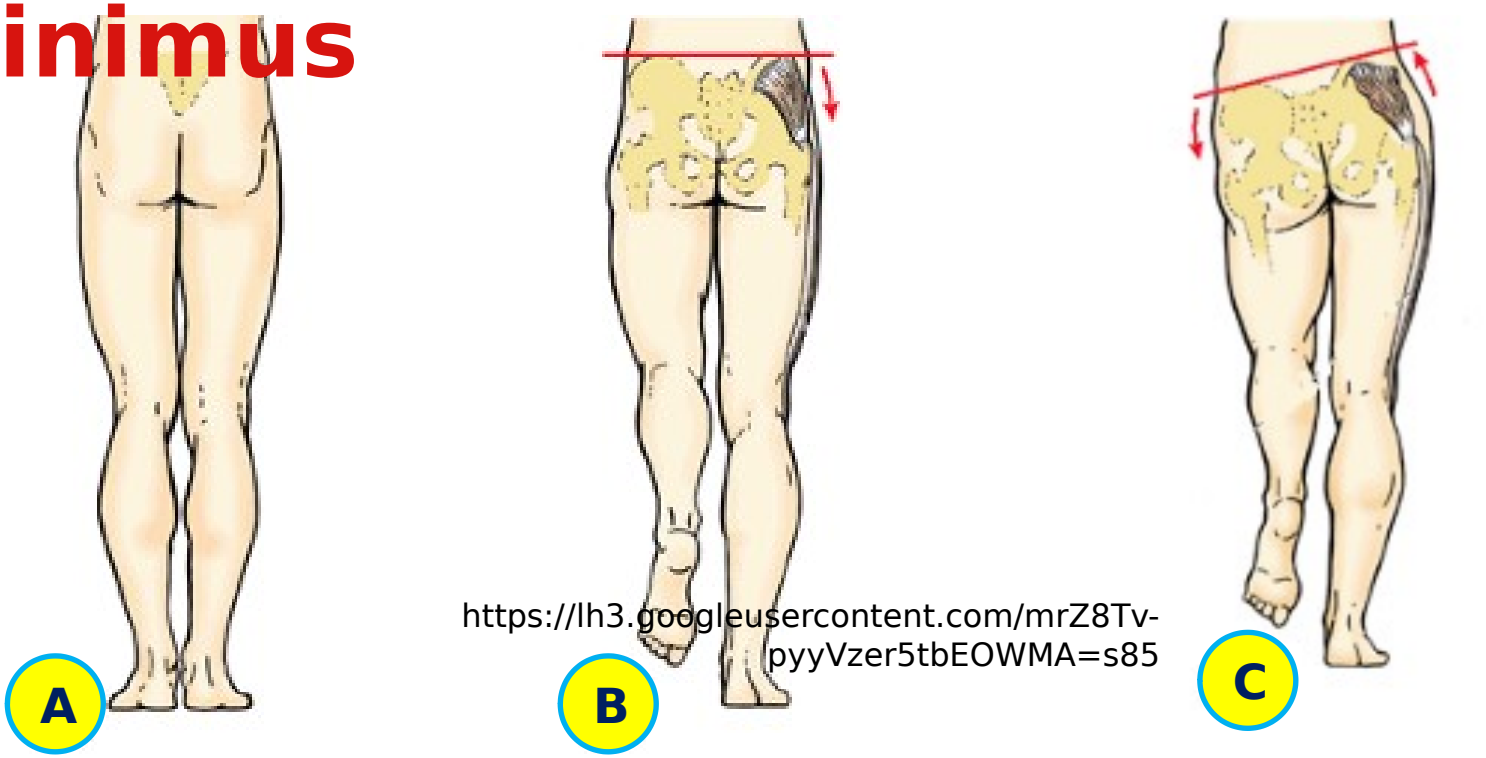
Glutei medius & minimus of the supporting side (right side) contract to prevent tilting of the pelvis to the unsupported limb



https://lh3.googleusercontent.com/cqE37EvgFvIc0dULZcNjjS4i

Glutei medius & minimus are important in each step during walking to maintain the balance of the pelvis

Action of gluteus medius and minimus



https://lh3.googleusercontent.com/mrZ8Tv-pyyVzer5tbEOWMA=s85

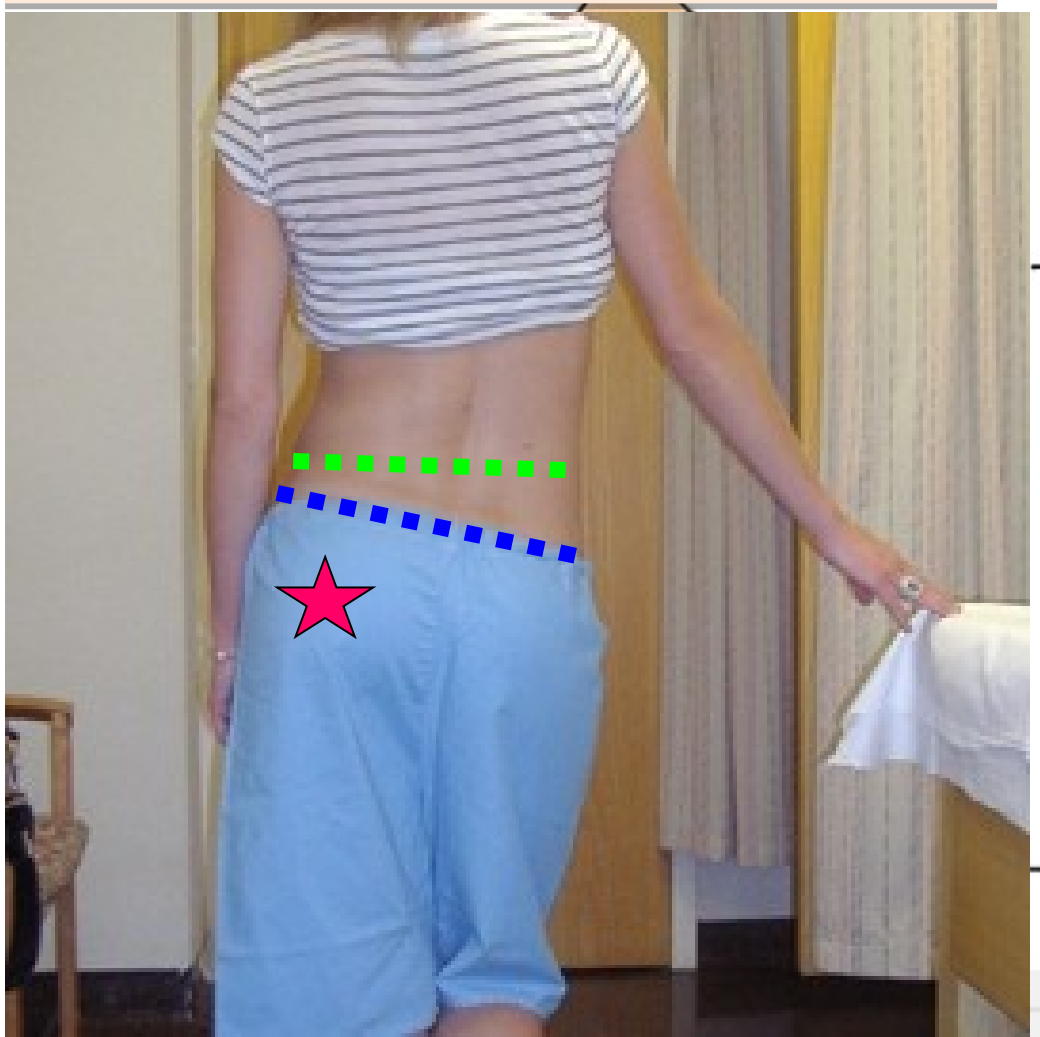
(A) When the weight is carried by both feet, the pelvis is evenly supported and does not tilt

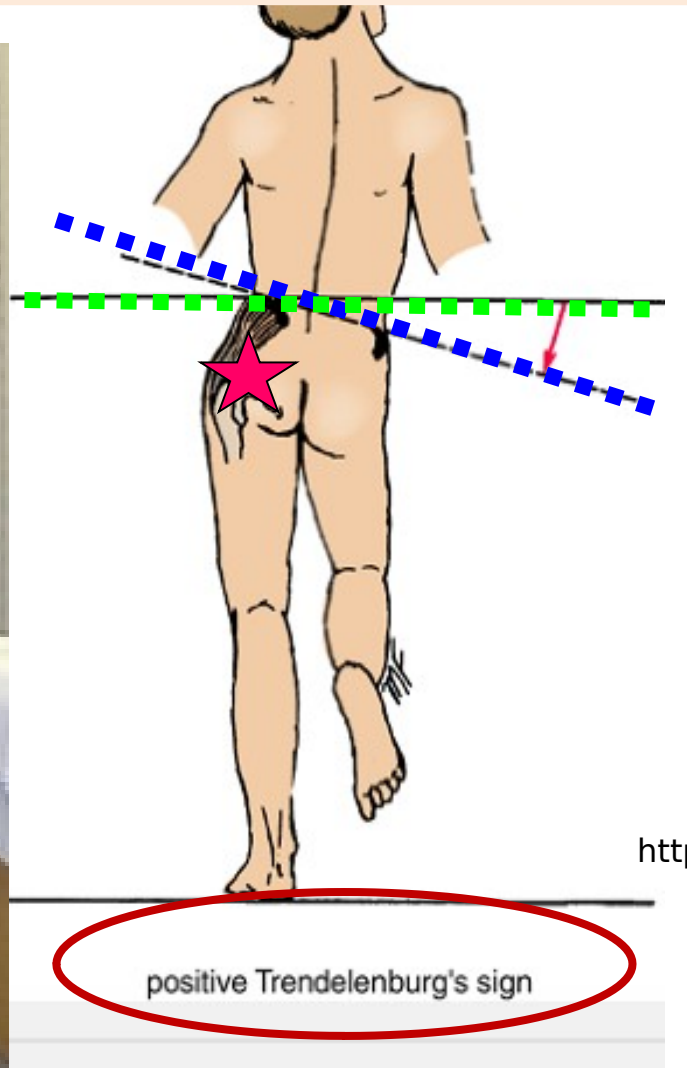
(B) When the weight is carried by the right lower limb, the muscles on the right side fix the pelvis so that it does not tilt to the unsupported left side.

(C) When the abductors on the right side are paralyzed (due to a lesion of the right superior gluteal nerve) fixation by these muscles is lost and the pelvis tilts to the unsupported left side (positive Trendelenburg

Positive Trendelenburg's sign

Ask the patient to stand on the affected side (Lt side) the pelvis tilts to the normal unsupported side (Rt side) indicating a positive TRENDELENBURG SIGN





https://lh3.googleusercontent.com/hPKlDGUzes3mODKfI5hGCt

Paralysis of the glutei medius & minimus due to injury of superior gluteal nerve leads to:

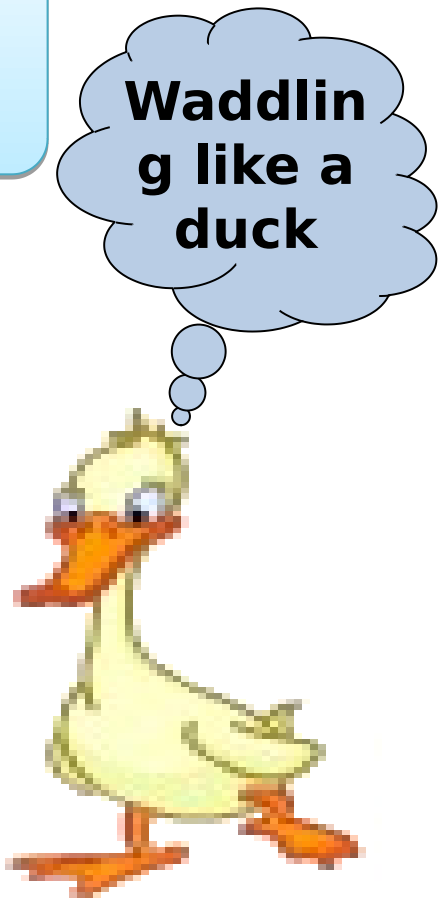
In case of unilateral paralysis

Lurching gait

The patient complains that when he stands on the injured side, the pelvis will tilt towards the normal side

In case of bilateral paralysis

Waddling gait

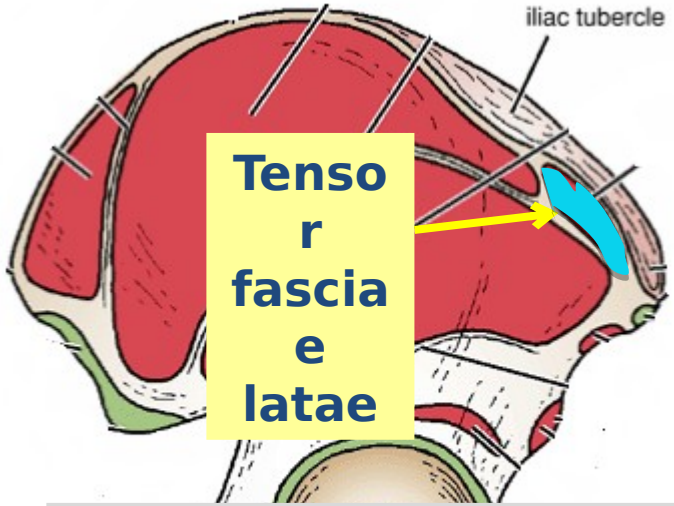


The patient complains that during walking the trunk is flexed from side to side with each step

https://lh3.googleusercontent.com/cqE37EvgFvIc0dULZcNJjS4i

Tensor fasciae latae

- **Origin from anterior part of outer lip of iliac crest**



https://lh3.googleusercontent.com/-Ws0573amuyVGDRC8

- **Insertion into iliotibial tract, which attaches to lateral condyle of tibia**

Nerve supply superior gluteal nerve

A

1) Tightens the iliotibial tract to stabilize the hip bone on femur & the femur on tibia to maintain the erect posture.

2) Helps extending

https://lh3.googleusercontent.com/

A 54 -year- old male presents with difficulty in walking. When asked to stand on his left foot , his right hip tilts significantly downward .

Which of the following nerves is the most likely injured?

A. Left superior gluteal

B. Left inferior gluteal

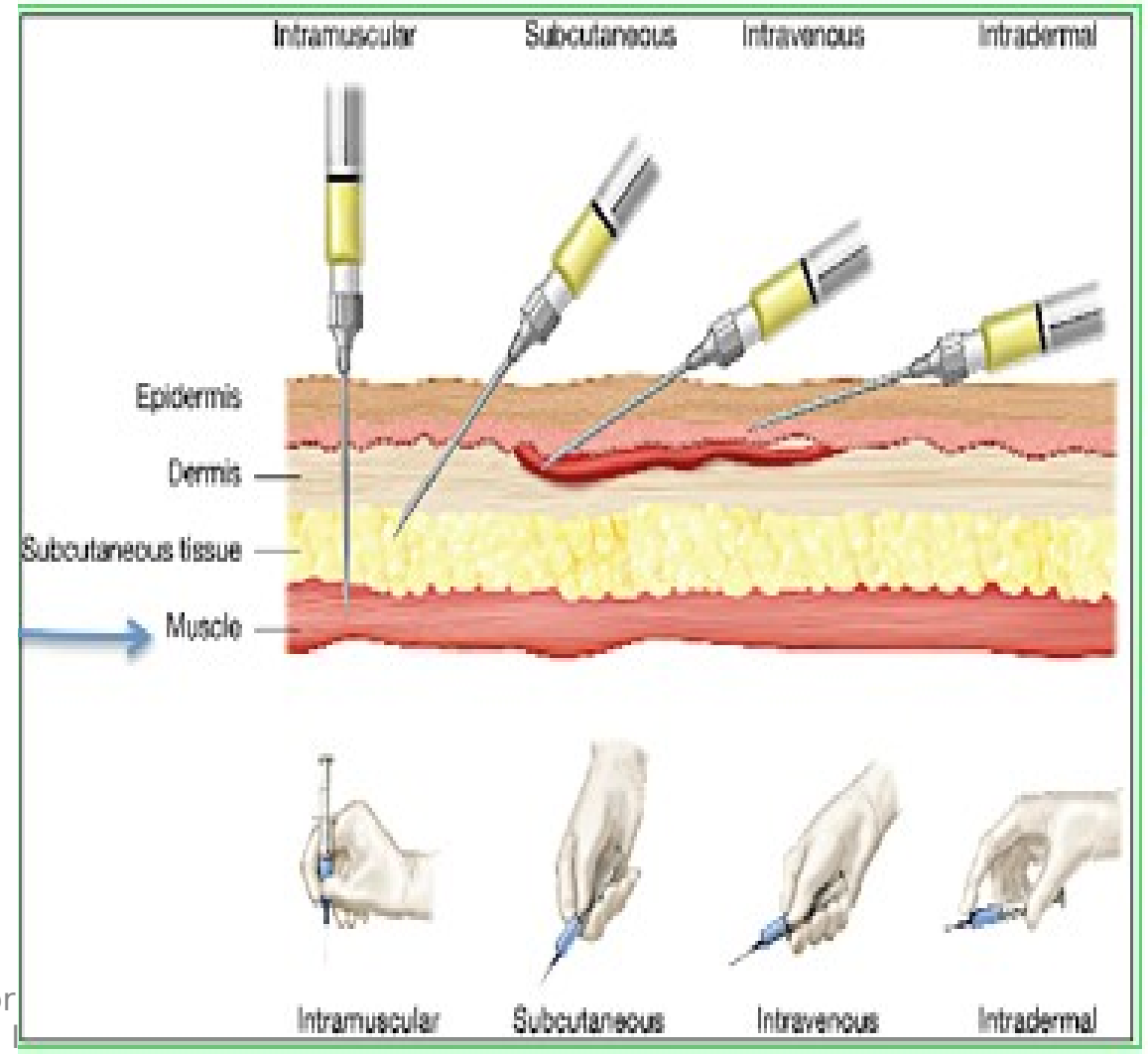
C. Right superior gluteal

D. Right inferior gluteal

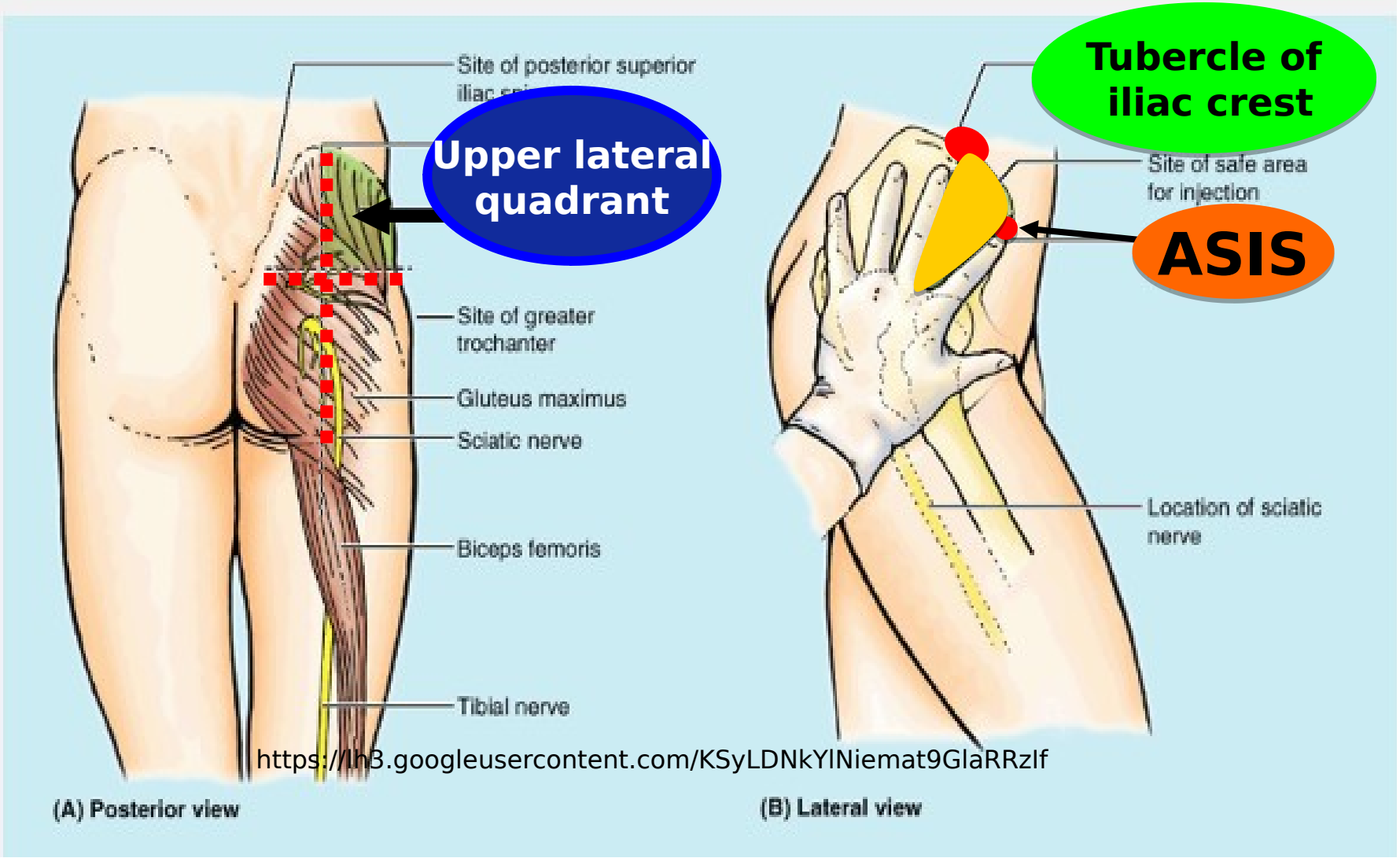
E. Sciatic

Applied anatomy

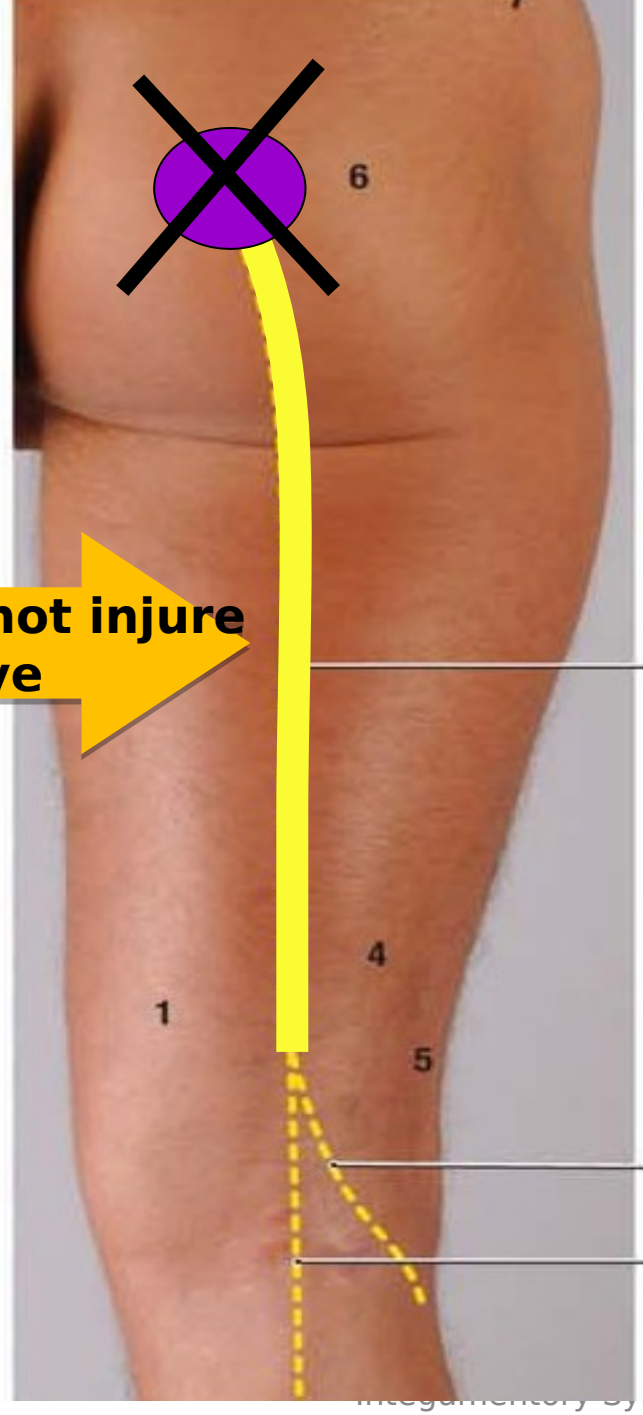
- **Because of the rich vascularity of the glutei muscles, it is advisable to do a short aspiration before an intramuscular injection as the tip of the needle may unfortunately lie inside the lumen of a blood vessel.**



Safe site for intramuscular injection in gluteal region upper lateral quadrant



https://lh3.googleusercontent.com/KSyLDNkYlNiemat9GlaRRzIf



DANGER!

So you do not injure sciatic nerve

DANGER!

NEVER GIVE INTRAMUSCULAR INJECTION IN CENTER OF BUTTOCK

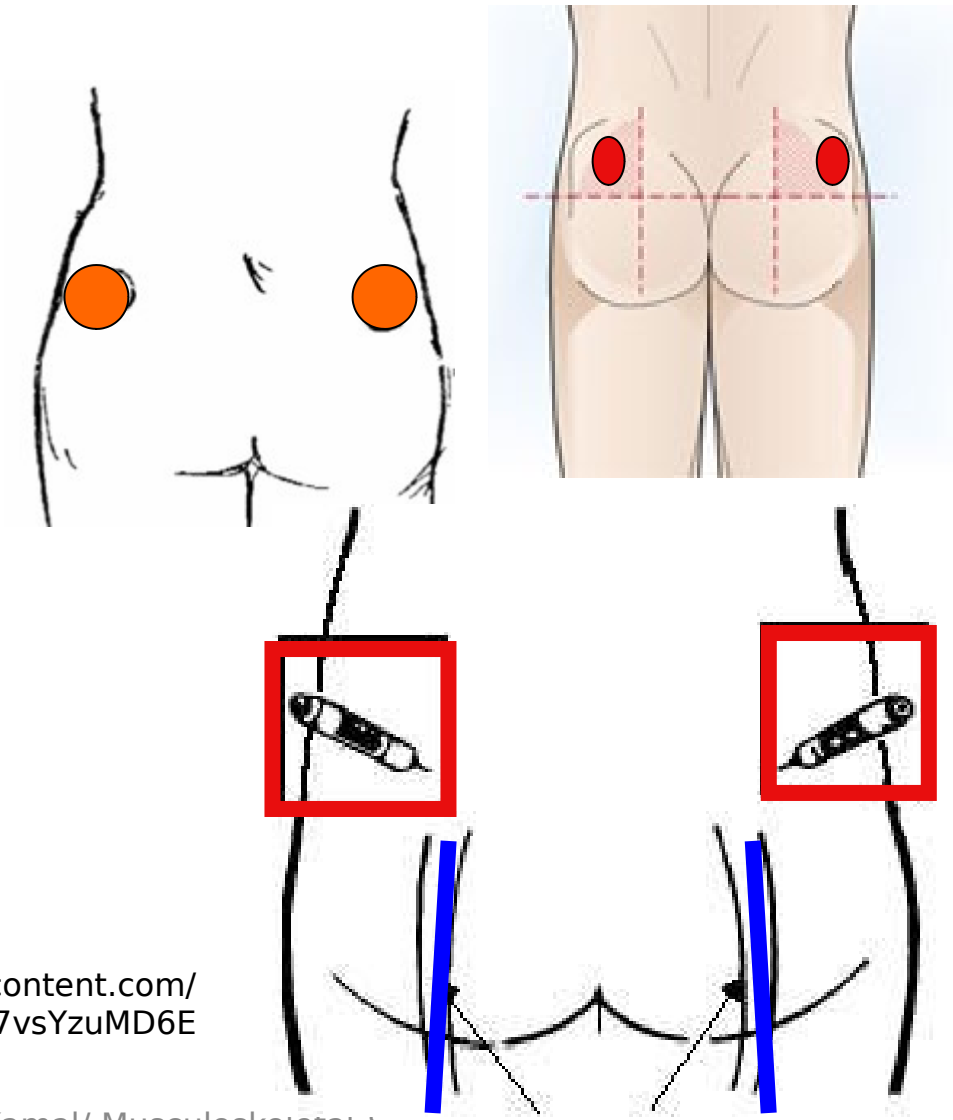
image

https://lh3.googleusercontent.com/k_xt_hBjgdApAw7YvXic9AA

Safest site for intramuscular injection

- **Superolateral part of buttock**

- **Avoid medial side of buttock so as not to injure the sciatic nerve**



https://lh3.googleusercontent.com/-AuXy7vsYzuMD6E

Which of the following quadrants is considered as a safe site for giving an IM injection in the gluteal ?region

A. Upper medial
B. Upper lateral
C. Lower medial
D. Lower lateral
E. Center of buttock

:Suggested Textbook

Clinical Anatomy for Medical Students
Richard S. Snell/ Third Edition
Pages: 569-572, 678, 688